

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 2, 6, 13 and 14 are currently being amended. No new matter has been added.

This amendment changes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-21 are now pending in this application.

Allowable subject matter

Applicants appreciate the indication that claims 6-8 and 13-19 contain allowable subject matter. Applicants have not amended claims 6-8 and 13-19 to be in independent form, however, because applicants believe that the independent claims from which these claims depend are allowable.

Rejections under 35 U.S.C. § 103

Claims 1-5, 9-12, 20 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,505,582 to Moteki et al. ("Moteki") in view of JP 1-163468 to Kuniaki to ("Kuniaki"). Applicants respectfully traverse these rejections for at least the following reasons.

Claim 1 is directed to a compression ratio controlling apparatus. The apparatus comprises a compression ratio controlling section that provides "a predetermined delay for a variation in the compression ratio toward one of the target high and low compression ratios at a time at which a transient state of the change in the engine load occurs in accordance with at least one of an engine driving history immediately before the transient state thereof occurs and a wall temperature of a combustion chamber of the engine immediately before the transient state thereof occurs." Moteki fails to suggest this feature of claim 1. Kuniaki fails to cure the deficiencies of Moteki.

Kuniaki discloses a variable compression ratio type engine. The engine is controlled to have a high compression ratio in a low load zone, and to have a low compression ratio in a high load zone (abstract). At the time of switching from the high to low compression ratio, the ignition timing is advanced (abstract).

Kuniaki, however, fails to disclose controlling the engine to provide “a predetermined delay for a variation in the compression ratio toward one of the target high and low compression ratios at a time at which a transient state of the change in the engine load occurs in accordance with at least one of an engine driving history immediately before the transient state thereof occurs and a wall temperature of a combustion chamber of the engine immediately before the transient state thereof occurs.” Kuniaki only discloses correcting the ignition timings temporarily toward the advance side during a switch between the high compression ratio and the low compression ratio to prevent the occurrence of the engine knocking and the lowering of engine output. Kuniaki does not disclose that during the transient state, in which the load is changed, a predetermined delay is provided for the variation in the compression ratio in accordance with at least one of an engine driving history immediately before the transient state occurs and a wall temperature of a combustion chamber of the engine immediately before the transient state thereof occurs. Thus, even if Moteki were modified according to the teachings of Kuniaki, the combination would not meet the limitations of claim 1.

Independent claim 21 is directed to a compression ratio controlling method comprising “providing a predetermined delay in a variation in the compression ratio toward one of the target high and low compression ratios at a time at which a transient state of a change in the engine load occurs in accordance with at least one of an engine driving history immediately before the transient state thereof and a wall temperature of a combustion chamber of the engine immediately before the transient state thereof.” Thus, claim 21 is patentable over Moteki and Kuniaki for reasons analogous to claim 1.

Independent claim 2 has been amended to recite “the compression ratio controlling section controlling the variable compression ratio mechanism to vary the compression ratio toward one of the target high and low compression ratios in such a manner that the varied compression ratio reaches to the one of the target high and low compression ratios after a passage of a predetermined period of time from a time at which a transient state of a change in the engine load occurs in accordance with at least one of an engine driving history immediately before the transient state thereof occurs and a wall temperature of a combustion chamber of the engine immediately before the transient state thereof occurs.” Thus, claim 2 is patentable over Moteki and Kuniaki for reasons analogous to claim 1.

The dependent claims under rejection are patentable for at least the same reasons as their respective independent claims, as well as for further patentable features recited therein.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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